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## A MANAGED CLIFF SWALLOW COLONY IN SOUTHERN WISCONSIN

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SEVERAL writers have described techniques and methods for songbird management. Most of the management practices are general suggestions applicable to a number of species. I know of no one who has measured the results from managing a species of songbird over a long period of time.

Mr. Cory Bodeman of Deerfield, Wisconsin, has succeeded in increasing a single pair of Cliff Swallows (*Petrochelidon albifrons albifrons*) to a colony of over 4,000 birds in 38 years. Without his help it is doubtful whether or not the first pair of birds, which arrived in 1904, would ever have succeeded in raising any young. It is certain that the present colony would be much smaller if the swallows had not been assisted.

### EARLY HISTORY

In early May, 1904, a pair of Cliff Swallows started building their nest on the east side of Mr. Bodeman's unpainted barn. The mud structure was located under a 20-inch eave and fastened to one of the two-inch vertical strips or battens that covered the cracks of the upright "siding." Daily observations showed that the swallows succeeded in hatching their eggs, but English Sparrows (*Passer domesticus*) killed the young at an early age and dragged them from their nest. The parent birds remained about the barn until late July, but did not lay a second clutch of eggs.

As a boy of 16, Mr. Bodeman became very angry with the sparrows and declared war on them immediately. Shot was expensive and not easy to get in 1904, so selected gravel was substituted in his father's muzzle-loading shotgun. It is impossible to estimate the number of sparrows shot during the years of the muzzle-loader, but the weathered boards around the barn are densely pock-marked, attesting to thousands of rounds fired.

The second year (1905) a pair of swallows nested in the same nest built the previous year. It is likely that these were the same birds that first constructed the nest, for they arrived on almost the same date, and occupied the nest immediately upon arrival. Both the resident and

neighboring sparrow populations were now greatly reduced; hence, the swallows had no difficulties in successfully hatching and rearing their young.

The swallows gradually increased until 1911, but that year there appeared to be fewer birds than in any of the preceding three years. Mr. Bodeman believes that drought conditions during 1910 caused a number of the swallows to attempt nesting at neighboring barns where there was more water and mud for nest building. These nestings were total failures, as uncontrolled sparrows killed all of the young swallows at these farms.

After 1911, mud pools were made available for nesting swallows during dry years to prevent the birds from moving to other nesting localities. Despite this help, the population did not increase as rapidly as was expected. In 1926, A. W. Schorger (1931: 7) counted 456 nests on the barn. He says, "All but 38 were located on the east side of the barn. Here there were three and four tiers of nests. . . . Slats have been nailed horizontally to help keep the nests in place."

#### LATER HISTORY

One of the most important management techniques necessary for successful Cliff Swallow management was learned by accident. During the spring of about 1928, a heavy rain washed most of the previous year's nests to the ground. New nests were rapidly built following the storm, and a great increase was noted in the size of the fall colony. Since the increase in population appeared to result directly from the construction of new nests, the old nests were knocked down the following spring by the use of a ladder and a long pole. Again nesting success appeared to be higher than in previous years; so thereafter the old nests were annually removed from the barn.

Examination of the removed nests showed that English Sparrows had carried many feathers into them and had occupied them during the absence of the swallows in fall and winter. Some of the nests showed that sparrows had begun to lay eggs in them before the swallows arrived. Many of the nests that contained old debris and feathers also contained dead swallows. Evidently the sparrows were directly responsible for heavy parasitism which caused considerable mortality among both the young and nesting parent swallows. New nests apparently were free of parasites.

This technique was very successful if mild weather prevailed after the first swallows arrived. However, a sudden drop in temperature after the swallows began to arrive one spring, caused insects to remain dormant and hence prevented swallows from feeding. All of the swallows remained flightless during the prolonged cold weather. Many of them perched in their partly-constructed nests waiting for warm weather. Exposure and hunger killed great numbers of the birds, while others

contracted diarrhea and died later. In telling me of the birds that had died, Mr. Bodeman said, "I picked up a milk pail full of the birds and took them to Deerfield so the people could see them." From that year to the present, only part of the old nests were knocked down before the birds arrived in the spring. If a sudden cold wave occurred, the swallows made use of the remaining old nests for protection. After nesting was well under way and the danger of low temperatures was past, all of the old nests were removed.



Figure 1. The use of horizontal strips for nesting. This is one of the most important techniques in Cliff Swallow management.

Before long it became apparent that the rapidly increasing swallow colony needed more room for nesting. In 1937, a two-inch horizontal strip was nailed on the barn 10 inches below the slats seen by Schorger in 1926. This gave the swallows an opportunity to extend their nests below those of the previous year, and gave them a secure foundation on which they could begin construction. A strip was placed on the opposite side of the barn the following year, and immediately the swallows utilized the entire strip for nesting. On July 21, 1940, about

1,200 nests were counted on the barn. On July 11, 1941, 1,970 nests were counted, and on July 14, 1942, 2,015 nests were counted. These counts are not accurate, as the number of nests that had fallen by July could not be determined, but they indicate that the colony is still increasing, for the number of fallen nests likely did not vary greatly during these three years.



Figure 2. East side of Mr. Bodeman's barn showing some of the 1,200 nests counted on July 21, 1940.

#### NESTING AND FEEDING

Some of the swallows are paired within a week following the arrival of the first birds. Nest building also begins at this time. Contrary to the belief of some observers, Cliff Swallows do not carry mud for their nests continuously. After enough mud has been brought and put in place to form about an inch of the nest, construction ceases while the mud dries. The length of the interval before construction continues is determined by the rapidity of drying. Cold weather causes a momentary halt in building whether or not the incomplete nest has dried sufficiently to enable additional pellets of mud to be added. I have observed intervals varying from one day to more than a week. As the nest nears completion, the amount of mud added per construction period decreases and the danger of breaking away part of the nest by building activity

increases. Accidents in construction may occur, but the fallen fragments are replaced rapidly. Part of the nest may be broken down during incubation, or after the young have hatched, but repairs are always made immediately.

T. S. Roberts (1932: 51) says, "The Eave Swallow's nest, in its perfect form, is a remarkable structure, but frequently the decurved entrance tunnel is imperfect or absent. The lack of reenforcing material, such as is used by the Barn Swallow, renders it very fragile when thoroughly dry. Both birds assist in the building and in the care of the young. The lining is often placed and the eggs laid before the completion of the nest. The pellets of sticky mud are gathered in the mouth, while the birds hover in the air with wings fully extended above the back." Although the wings are nearly always extended above the back while the swallows gather mud, they do not actually hover in the air. Considerable support is gained by placing their extended feet on the mud during this process. Some swallows were seen resting at the supply of mud, while most of them rested at the nest site. He adds that ". . . nests are partially superimposed upon one another; inside nests [are made] of bits of straw, grass, or feathers." Of the several thousand nests I have observed, all contained small quantities of straw, grass, or leaves, but practically none contained feathers. The nests that contained feathers were heavily lined with them, and obviously were feathered by sparrows. During the peak of nest building activity from five to 40 swallows were seen at one time selecting native grass and sedge materials from a hog house covered with hay cut in a nearby marsh, but no swallows were ever seen selecting materials from the oat and barley straw piles closer to the barn.

Four or five eggs are generally deposited soon after the mud dries, but as Roberts stated, they may be deposited before the nest is completed.

Some of the birds compete strongly for nest sites. In their competition they often fight, become completely engrossed in their struggles, and flutter to the ground where they are easily caught by cats. I do not know whether these are males or females, as the sexes are difficult to distinguish.

In spite of all efforts to shoot the sparrows that come near the barn, some succeed in laying eggs in the swallow nests. When this occurs, the swallow incubates the eggs and feeds the young. If a swallow chances to lay an egg in a sparrow-occupied nest, the sparrow refuses to incubate any of the eggs.

The growth rate of the newly-hatched sparrows is greater than that of the newly-hatched swallows; hence the sparrows soon dominate the young swallows, crowd to the nest opening, get nearly all of the food brought to the nest by the parent swallows, and eventually starve the young swallows. By listening for the characteristic calls of the young



sparrows from the nests, it is easy to locate the ones that contain these parasites. Breaking open the entrance of the nest reveals the emaciated swallows. After the young sparrows are removed, the nest is repaired and the swallows are adequately cared for.

In April, May, and June, the entire colony may leave the barn for two or more hours a day to feed. During these feeding periods the young are especially vulnerable to the onslaughts of sparrows. On one occasion Mr. Bodeman attended a circus in Madison and found that "sparrows had killed hundreds of young swallows" while he was gone. The young were pecked on the head, and in most cases dragged from their nests.

When insects were abundant close to the barn during the period of juvenile development, the adult birds did not go out together as a single group. In this case there was mutual association of the birds at all times, for there appeared to be a continuous flight of departing and incoming birds between the barn and the source of the insect food. The most conspicuous example of such feeding occurred while an alfalfa field was being mowed near the barn. A large group of birds constantly hovered over and behind the mower and caught the moths (*Noctuidae*) that were disturbed to flight by the sickle. Each bird seemed to be trying to get the maximum number of moths it could carry before departing for its nest. Frequently birds were seen dropping moths as they attempted to get additional ones in their mouths.

#### POST-NESTING PERIOD

Several writers have stated that Cliff Swallows commonly raise two broods of young in a season. During July, while the early-hatched young are spending most of their time on the barn roof, a few swallows may be observed incubating eggs. It seems more likely that these incubating birds are not raising a second brood but are re-nesting birds whose first nests fell from the barn.

Soon after the early-hatched young have reached mature size, they leave their nesting site with their parents. The size of the group varies according to the number of birds that began nesting early. From the time the first group leaves until the late-hatched young have grown to adult size, several groups may leave the nesting site. Each group apparently remains intact after leaving the nesting site but may congregate with Barn Swallows, Rough-winged Swallows, Tree Swallows, or Bank Swallows. These heterogeneous groups seek the open fields and ponds where food is abundant and go through a conditioning period preparatory to fall migration.

The nature and direction of Cliff Swallow dispersion from nesting sites is not understood. I believe that more Cliff Swallows disperse to the north of their nesting localities than in any other direction. The appearance of large groups of Cliff Swallows north of known nesting sites, following the nesting period, suggests this movement. Elton

Bussewitz informs me that nearly all Cliff Swallows recorded in the vicinity of Watertown (17 miles northeast of Mr. Bodeman's farm) were seen during July and August. During this same period I have been unable to secure swallow records for the region south of Mr. Bodeman's farm. Other records substantiate this observation. H. H. T. Jackson (1923: 486) saw "about 300 Cliff Swallows roosting on the telephone wires at Bent's Camp," Mamie Lake, Wisconsin, from August 22 to 28, 1917. He does not give earlier-season records for a large-sized group. All the Cliff Swallows I have seen during late July and August, in the latitude of southern Wisconsin were flying northward. It is possible that all Cliff Swallows in this region start northward and later, when they have finished their conditioning period, migrate southward over a more eastern or western route. Evidence for this northern movement is not conclusive, and banding studies will be necessary to verify or disprove it.

#### MANAGEMENT

The success of Cliff Swallow management depends largely upon the success of sparrow control. Its importance is pointed out by William Brewster (1906: 300) who says "the Eave Swallow suffers directly and very seriously from the encroachments of the House Sparrows who destroy its eggs and young and take possession of its nests whenever opportunity offers." T. S. Roberts (1932: 50), W. B. Barrows (1912: 544), E. H. Forbush (1929: 145), Joseph Grinnell (1937: 207), and Dayton Stoner (1939: 221) are among the numerous writers who have recorded similar depredations by the sparrow. Mr. Bodeman has found it advisable to shoot sparrows every month in the year. When the swallows arrive in the spring, less shooting is necessary to keep the sparrows under control. From April, 1941, to April, 1942, Mr. Bodeman shot 1,075 rounds of 22-caliber shot cartridges at sparrows. Estimating two birds for every three shots fired gives a kill of 717 sparrows. This estimate is probably low, for I have seen him shoot six consecutive sparrows without a miss.

Although mud may be carried for nest building as far as three-fourths of a mile, it should be made available close to the nesting site. Long-distance carrying often results in some of the swallows nesting in undesirable locations near the mud supply. Such nestings cause a reduced population due to the loss of all young and part of the adults. Mud pools should be made in the open where they are easily found by swallows and not easily approached by cats. Loam, silt loam, and clay loam (rather than sandy or gravelly soils) make the best mud for nest-building.

Once Mr. Bodeman fastened old Cliff Swallow nests to his machine shed and thus induced swallows to nest there. The machine shed never had nests on it prior to his experiment. He had done it only as an experiment and did not want the swallows to continue there, so at the end of the season he knocked down all of the nests and the swallows

made no effort to rebuild on the shed in subsequent seasons.

When colonies increase and nests are extended more than four feet below the eaves, more eaves or shelves should be added, as heavy rains may wash away nests that are not protected by the eaves.

The oil in paint does not allow mud to adhere to painted surfaces. If it becomes necessary to paint the barn occupied by nesting swallows, a strip should be left unpainted beneath the eaves on which the birds can fasten their nests. If painting the entire barn is necessary, an unpainted board or two may be nailed beneath the eaves for the swallows. Rough lumber is much better for nesting than planed lumber.

#### CHRONOLOGY

- April 13 to 25: First Cliff Swallows arrive at Deerfield, Wisconsin.  
(Fly directly to nesting site).
- April 30: Last birds reach nesting location. (Some of the earliest arrivals are now paired).
- May 1 to 15: Early arrivals building nests. (Most birds have little or none of their nests constructed).
- May 15 to 31: Peak of nest-building activity.
- June 10: Most nests completed. (About five per cent still carrying mud).
- June 1 to 10: First eggs hatch.
- June 10 to 20: Period of most frequent hatching.
- July 10: Last eggs hatch.
- July 20 to August 15: Last birds leave nesting location.
- July 20 to September 1: Most birds preparing for migration. (Do not return to nesting location).
- Sept. 1 to 15: Most birds migrating southward.
- Oct. 4: Last birds leave Deerfield, Wisconsin.

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WISCONSIN CONSERVATION DEPARTMENT, MADISON, WISCONSIN

BIRDS ACROSS THE SKY. By Florence Page Jaques. Illustrations by Francis Lee Jaques. Harper & Brothers, N.Y. 1942: 5½ x 8 in., xiv + 240 pp., 25 pls. \$2.50.

From the firm of Florence Page and Francis Lee Jaques, we have learned to expect art and artistry, charm and humor. In this, their latest effort, there is all of that. Ornithologists will find amusement in seeing how funny they sometimes appear to a layman, even a sympathetic one. Laymen will find enthusiasm and a very non-technical explanation of some of the strange antics of the trained "bird-man." No more understanding readers can be found than ornithologists' wives who, trained in other fields, have had ornithology and ornithologists thrust upon them with matrimony. They will confirm Mrs. Jaques' pictures of the patient efforts of the birdmen to educate which, nevertheless, leave the learner feeling well-nigh imbecilic and exasperated beyond measure. They will give joyful assent to her assertions that a richer and more absorbing life comes with a fuller acquaintance with the bird world. They will heartily endorse her descriptions of bird addicts as "some of the finest, most delightful and inspiring people."

Mrs. Jaques writes with facility, with a light philosophical touch, and with a sensitiveness not only to word sounds and meanings, but also to colors and situations. She differs from the bird census takers, perhaps also the taxonomists, by her acceptance of the bird as an individual, not as belonging to species or subspecies, tagged with absurdly long polysyllabic names. Her effort to describe sound and color effects is challenging, though it will convey varying meanings to different readers, as in "the gold-dark song" of the hermit thrush, or the "stainless sky."

Mr. Jaques has added greatly to the charm of the book with many delightful black and white drawings. Some are significant for their humor, others for sense of graceful movement, others for accurate characterization. His love of trees and his knowledge of them are beautifully exemplified in "Grey Fallodon" and "Deep Forest." As usual, Mr. Jaques' duck pictures are of especial interest.

Lovers of England and the English will find the chapter describing an English spring and the meeting with Lord Grey sharply disturbing when read in these harrowing times. Those who have read "Canoe Country" and "The Geese Fly High" will probably find Mrs. Jaques' sidelights on the American Museum of Natural History, and especially the description of her husband's method of planning the lovely exhibits, her joy in the dance of the woodcock, and the elation which the migration of the Blue and Snow Geese brought to her, of particular interest. "Birds Across The Sky" is not as even as the two preceding books, partly because it describes such various episodes and partly because it is handicapped by a "purpose to instruct." It lacks the lyrical quality of "Canoe Country" and the pure joyousness of "The Geese Fly High." In spite of these slight criticisms this book will bring gratification because of its many merits and because of the varied interests, the quick and sensitive feeling, and the joyful nature and warm sympathy of the author.—Helen Van Tyne.